Complete Summary

GUIDELINE TITLE

Diseases characterized by urethritis and cervicitis. Sexually transmitted diseases treatment guidelines 2002.

BIBLIOGRAPHIC SOURCE(S)

Centers for Disease Control and Prevention. Diseases characterized by urethritis and cervicitis. Sexually transmitted diseases treatment guidelines. MMWR Recomm Rep 2002 May 10;51(RR-6):30-42.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Nongonococcal urethritis (NGU)
- Mucopurulent cervicitis (MPC)
- Chlamydial infection, including genital infection, ophthalmia neonatorum, and infant pneumonia
- Gonorrhea and other gonococcal infections including quinolone-resistant Neisseria gonorrhoeae infection, gonococcal infection of the pharynx, gonococcal conjunctivitis, disseminated gonococcal meningitis and endocarditis, ophthalmia neonatorum and gonococcal scalp abscess in newborns.

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management

Prevention
Treatment

CLINICAL SPECIALTY

Family Practice
Infectious Diseases
Internal Medicine
Obstetrics and Gynecology
Pediatrics
Preventive Medicine
Urology

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Health Care Providers
Managed Care Organizations
Nurses
Physician Assistants
Physicians
Public Health Departments

GUIDELINE OBJECTIVE(S)

- To update the 1998 Guidelines for Treatment of Sexually Transmitted Diseases (MMWR 1998;47[No. RR-1])
- To assist physicians and other health-care providers in preventing and treating sexually transmitted diseases (STDs)
- To present updated recommendations for the diagnosis, treatment, and prevention of STDs characterized by urethritis and cervicitis, including nongonococcal urethritis, mucopurulent cervicitis, chlamydial infection, gonorrhea, and gonococcal infections

TARGET POPULATION

- Men with urethritis
- Individuals with nongonococcal urethritis
- Women with mucopurulent cervicitis
- Adolescents and adults with chlamydial infection
- Infants with chlamydial infection
- Adolescents and adults with gonococcal infection
- Individuals with quinolone resistant Neisseria gonorrhoeae infection
- Newborns, infants, and children with gonococcal infection
- Sex partners of individuals with any of the above infections
- Mothers of infants who have any of the above infections
- Infants of mothers who have any of the above infections

INTERVENTIONS AND PRACTICES CONSIDERED

Note from the National Guideline Clearinghouse and the Centers for Disease Control and Prevention: These guidelines focus on the treatment and counseling of individual patients and do not address other community services and interventions that are important in sexually transmitted disease/human immunodeficiency virus (STD/HIV) prevention.

Diagnosis/Screening

Nongonococcal urethritis

1. Gram stain of urethral secretions demonstrating ≥ 5 white blood cells per oil immersion field
2. Leukocyte esterase test on first-void urine or microscopic examination of first-void urine demonstrating ≥ 10 white blood cells per high power field
3. Wet mount examination and culture of an intraurethral swab for Trichomonas vaginalis

Mucopurulent cervicitis

1. Culture or nucleic acid amplification test for Chlamydia trachomatis (C. trachomatis) or Neisseria gonorrhoeae
2. Count of polymorphonuclear leukocytes on endocervical Gram stain

Chlamydial infection

1. Screening of sexually active adolescents and young adults during routine annual examinations
2. Annual screening of older women with risk factors
3. Prenatal screening of pregnant women, especially those < 25 years of age and those with multiple sex partners
4. Tissue culture and nonculture tests (e.g., direct fluorescent antibody tests, enzyme immunoassays, and nucleic acid amplification tests) for C. trachomatis

Gonococcal infection

1. Screening of women at high risk for sexually transmitted diseases
2. Screening of pregnant women
3. Culture and antimicrobial sensitivity testing of gonococci isolates in patients with resistance to treatment and in cases of infections in newborns and children
4. Nonculture tests for gonococci (gram-stained deoxyribonucleic acid (DNA) probes, enzyme immunoassay tests)

Treatment

Nongonococcal urethritis

1. Azithromycin
2. Doxycycline
3. Erythromycin base

4. Erythromycin ethylsuccinate
5. Ofloxacin
6. Levofloxacin
7. Metronidazole plus erythromycin base or erythromycin ethylsuccinate

Mucopurulent cervicitis

1. Empiric treatment
2. Treatment based on microbial sensitivity tests

Chlamydial infection

1. Azithromycin
2. Doxycycline
3. Erythromycin base
4. Erythromycin ethylsuccinate
5. Ofloxacin
6. Levofloxacin
7. Amoxicillin

Gonococcal infection

1. Dual therapy for gonococcal and chlamydial infection (select quinolone or cephalosporin antibiotic plus azithromycin or doxycycline)
2. Quinolone antibiotics, such as ciprofloxacin, ofloxacin, levofloxacin, norfloxacin, lomefloxacin, and gatifloxacin
3. Cephalosporins such as cefixime, ceftriaxone, ceftizoxime, and cefotaxime
4. Spectinomycin
5. Prophylactic treatment of ophthalmia neonatorum with silver nitrate aqueous solution, erythromycin ophthalmic solution, tetracycline ophthalmic solution

Management

1. Sex partner notification and referral for examination and treatment
2. Follow-up to ensure that treatment has been affective and to detect possible reinfection, with patient instruction to abstain from sexual intercourse until treatment is completed

MAJOR OUTCOMES CONSIDERED

- Microbiologic cure
- Alleviation of signs and symptoms
- Prevention of sequelae
- Prevention of transmission
- Cost of treatment
- Sensitivity and specificity of diagnostic tests

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Subjective Review

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Beginning in 2000, Centers for Disease Control and Prevention (CDC) personnel and professionals knowledgeable in the field of sexually transmitted diseases (STDs) systematically reviewed literature (i.e., published abstracts and peer-reviewed journal articles) concerning each of the major STDs, focusing on information that had become available since publication of the 1998 Guidelines for Treatment of Sexually Transmitted Diseases. Background papers were written and tables of evidence constructed summarizing the type of study (e.g., randomized controlled trial or case series), study population and setting, treatments or other interventions, outcome measures assessed, reported findings, and weaknesses and biases in study design and analysis. A draft document was developed on the basis of the reviews.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note from the National Guideline Clearinghouse and the Centers for Disease Control and Prevention: When more than one therapeutic regimen is recommended, the sequence is alphabetized unless the choices for therapy are prioritized based on efficacy, convenience, or cost. For sexually transmitted diseases (STDs) with more than one recommended regimen, almost all regimens have similar efficacy and similar rates of intolerance or toxicity unless otherwise specified.

Management of Male Patients Who Have Urethritis

Urethritis is caused by an infection characterized by urethral discharge of mucopurulent or purulent material and sometimes by dysuria or urethral pruritis. Asymptomatic infections are common. The principal bacterial pathogens of proven clinical importance in men who have urethritis are Neisseria gonorrhoeae (N. gonorrhoeae) and Chlamydia trachomatis (C. trachomatis). Testing to determine the specific etiology is recommended because both chlamydia and gonorrhea are conditions that are reportable to state health departments, and a specific diagnosis may enhance partner notification and improve compliance with treatment, especially in the exposed partner. If diagnostic tools (e.g., a Gram stain and microscope) are unavailable, patients should be treated for both infections. The additional antibiotic exposure and expense of treating a person who has nongonococcal urethritis (NGU) for both infections also should encourage the health-care provider to make a specific diagnosis. Nucleic acid amplification tests enable detection of N. gonorrhoeae and C. trachomatis on all specimens. These tests are more sensitive than traditional culture techniques for C. trachomatis and are the preferred method for the detection of this organism.

Etiology

NGU is diagnosed if Gram-negative intracellular diplococci cannot be identified on urethral smears. C. trachomatis is a frequent cause (i.e., 15%--55% of cases); however, the prevalence differs by age group, with lower prevalence of this organism among older men. The proportion of NGU cases caused by chlamydia has been declining gradually. Complications of NGU among men infected with C. trachomatis include epididymitis and Reiter's syndrome. Documentation of chlamydia infection is important because of the need for partner referral for evaluation and treatment.

The etiology of most cases of nonchlamydial NGU is unknown. Ureaplasma urealyticum and Mycoplasma genitalium have been implicated as causes of NGU in some studies. Specific diagnostic tests for these organisms are not indicated, because the detection of these organisms is often difficult and would not alter therapy.

T. vaginalis and herpes simplex virus (HSV) sometimes cause NGU. Diagnostic and treatment procedures for these organisms are reserved for situations in which these infections are suspected (e.g., contact with trichomoniasis and genital lesions suggestive of genital herpes) or when NGU is not responsive to therapy.

Confirmed Urethritis

Clinicians should document that urethritis is present. Urethritis can be documented on the basis of any of the following signs.

- Mucopurulent or purulent discharge.
- Gram stain of urethral secretions demonstrating ≥5 white blood cells (WBCs) per oil immersion field. The Gram stain is the preferred rapid diagnostic test for evaluating urethritis. It is highly sensitive and specific for documenting both urethritis and the presence or absence of gonococcal infection. Gonococcal infection is established by documenting the presence of white blood cells containing intracellular Gram-negative diplococci.
- Positive leukocyte esterase test on first-void urine or microscopic examination of first-void urine demonstrating ≥10 white blood cells per high power field.

If none of these criteria is present, then treatment should be deferred, and the patient should be tested for N. gonorrhoeae and C. trachomatis and followed closely if test results are negative. If the results demonstrate infection with either N. gonorrhoeae or C. trachomatis, the appropriate treatment should be given and sex partners referred for evaluation and treatment.

Empiric treatment of symptoms without documentation of urethritis is recommended only for patients at high risk for infection who are unlikely to return for a follow-up evaluation. Such patients should be treated for gonorrhea and chlamydia. Partners of patients treated empirically should be evaluated and treated.

Management of Patients Who Have Nongonococcal Urethritis

Diagnosis

All patients who have urethritis should be evaluated for the presence of gonococcal and chlamydial infection. Testing for chlamydia is strongly recommended because of the increased utility and availability of highly sensitive and specific testing methods, and because a specific diagnosis may enhance partner notification and improve compliance with treatment, especially in the exposed partner.

Treatment

Treatment should be initiated as soon as possible after diagnosis. Single-dose regimens have the advantage of improved compliance and of directly observed therapy (DOT). To improve compliance, the medication should be provided in the clinic or health-care provider's office.

Recommended Regimens

- Azithromycin 1 g orally in a single dose

  OR

- Doxycycline 100 mg orally twice a day for 7 days

Alternative Regimens

- Erythromycin base 500 mg orally four times a day for 7 days

  OR

- Erythromycin ethylsuccinate 800 mg orally four times a day for 7 days

  OR

- Ofloxacin 300 mg twice a day for 7 days

  OR

- Levofloxacin 500 mg once daily for 7 days

Follow-Up for Patients Who Have Urethritis

Patients should be instructed to return for evaluation if symptoms persist or recur after completion of therapy. Symptoms alone, without documentation of signs or laboratory evidence of urethral inflammation, are not a sufficient basis for re-treatment. Patients should be instructed to abstain from sexual intercourse until 7 days after therapy is initiated.

Partner Referral

Patients should refer for evaluation and treatment all sex partners within the preceding 60 days. Because a specific diagnosis may facilitate partner referral, testing for gonorrhea and chlamydia is encouraged.

Recurrent and Persistent Urethritis

Objective signs of urethritis should be present before initiation of antimicrobial therapy. Effective regimens have not been identified for treating patients who do not have objective signs of urethritis but who have persistent symptoms after treatment. Patients who have persistent or recurrent urethritis should be re-

treated with the initial regimen if they did not comply with the treatment regimen or if they were reexposed to an untreated sex partner. Otherwise, a culture of an intra-urethral swab specimen and a first-void urine specimen for T. vaginalis should be performed. Some cases of recurrent urethritis following doxycycline treatment may be caused by tetracycline-resistant U. urealyticum. Urologic examinations usually do not reveal a specific etiology. If the patient was compliant with the initial regimen and re-exposure can be excluded, the following regimen is recommended.

Recommended Regimens

- Metronidazole 2 g orally in a single dose

  PLUS

- Erythromycin base 500 mg orally four times a day for 7 days

  OR

- Erythromycin ethylsuccinate 800 mg orally four times a day for 7 days

Special Considerations

HIV Infection

Gonococcal urethritis, chlamydial urethritis, and nongonococcal, nonchlamydial urethritis may facilitate HIV transmission. Patients who have nongonococcal urethritis and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative.

Management of Patients Who Have Mucopurulent Cervicitis (MPC)

MPC is characterized by a purulent or mucopurulent endocervical exudate visible in the endocervical canal or in an endocervical swab specimen. Some specialists also diagnose MPC on the basis of easily induced cervical bleeding. Although some specialists consider an increased number of polymorphonuclear leukocytes on endocervical Gram stain as being useful in the diagnosis of MPC, this criterion has not been standardized, has a low positive-predictive value (PPV), and is not available in some settings. MPC often is asymptomatic, but some women have an abnormal vaginal discharge and vaginal bleeding (e.g., after sexual intercourse). MPC can be caused by C. trachomatis or N. gonorrhoeae; however, in most cases neither organism can be isolated. MPC can persist despite repeated courses of antimicrobial therapy. Because relapse or reinfection with C. trachomatis or N. gonorrhoeae usually does not occur in persons with persistent cases of MPC, other non-microbiologic determinants (e.g., inflammation in the zone of ectopy) might be involved.

Patients who have MPC should be tested for C. trachomatis and for N. gonorrhoeae with the most sensitive and specific test available. However, MPC is

not a sensitive predictor of infection with these organisms; most women who have C. trachomatis or N. gonorrhoeae do not have MPC.

Treatment

The results of sensitive tests for C. trachomatis or N. gonorrhoeae (e.g., culture or nucleic acid amplification tests) should determine the need for treatment, unless the likelihood of infection with either organism is high or the patient is unlikely to return for treatment. Empiric treatment should be considered for a patient who is suspected of having gonorrhea and/or chlamydia if a) the prevalences of these infections are high in the patient population and b) the patient might be difficult to locate for treatment. If relapse and reinfection have been excluded, management options of persistent MPC are undefined. For such persons, additional antimicrobial therapy may be of minimal benefit.

Follow-Up

Follow-up should be conducted as recommended for the infections for which a woman is being treated. If symptoms persist, women should be instructed to return for reevaluation and to abstain from sexual intercourse, even if they have completed the prescribed therapy.

Management of Sex Partners

Management of sex partners of women treated for MPC should be appropriate for the identified or suspected STD. Partners should be notified, examined, and treated for the STD identified or suspected in the index patient.

Because a microbiologic test of cure usually is not recommended, patients and their sex partners should abstain from sexual intercourse until therapy is completed (i.e., 7 days after a single-dose regimen or after completion of a 7-day regimen).

Special Considerations

HIV Infection

Patients who have mucopurulent cervicitis and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative.

Chlamydial Infections

In the United States, chlamydial genital infection occurs frequently among sexually active adolescents and young adults. Asymptomatic infection is common among both men and women. Sexually active adolescent women should be screened for chlamydial infection at least annually, even if symptoms are not present. Annual screening of all sexually active women aged 20--25 years is also recommended, as is screening of older women with risk factors (e.g., those who have a new sex partner and those with multiple sex partners). An appropriate sexual risk assessment should always be conducted and may indicate more frequent screening for some women.

Chlamydial Infections in Adolescents and Adults

Several important sequelae can result from C. trachomatis infection in women; the most serious of these include pelvic inflammatory disease (PID), ectopic pregnancy, and infertility. Some women who have apparently uncomplicated cervical infection already have subclinical upper-reproductive--tract infection. A recent investigation of patients in a health maintenance organization demonstrated that screening and treatment of cervical infection can reduce the likelihood of PID.

Treatment

Treating infected patients prevents transmission to sex partners. In addition, treatment of chlamydia in pregnant women usually prevents transmission of C. trachomatis to infants during birth. Treatment of sex partners helps to prevent reinfection of the index patient and infection of other partners.

Coinfection with C. trachomatis often occurs among patients who have gonococcal infection; therefore, presumptive treatment of such patients for chlamydia is appropriate (see the section on Gonococcal Infection, Dual Therapy for Gonococcal and Chlamydial Infections, below). The following recommended treatment regimens and alternative regimens cure infection and usually relieve symptoms.

Recommended Regimens

- Azithromycin 1 g orally in a single dose

  OR

- Doxycycline 100 mg orally twice a day for 7 days

Alternative Regimens

- Erythromycin base 500 mg orally four times a day for 7 days

  OR

- Erythromycin ethylsuccinate 800 mg orally four times a day for 7 days

  OR

- Ofloxacin 300 mg orally twice a day for 7 days

  OR

- Levofloxacin 500 mg orally for 7 days

The results of clinical trials indicate that azithromycin and doxycycline are equally efficacious. These investigations were conducted primarily in populations in which follow-up was encouraged and adherence to a 7-day regimen was good. Azithromycin should always be available to health-care providers to treat patients for whom compliance is in question.

In populations that have erratic health-care-seeking behavior, poor compliance with treatment, or unpredictable follow-up, azithromycin may be more cost-effective because it enables the provision of single-dose directly observed therapy. Doxycycline costs less than azithromycin, and it has been used extensively for a longer period. Erythromycin is less efficacious than either azithromycin or doxycycline, and gastrointestinal side effects frequently discourage patients from complying with this regimen. Ofloxacin is similar in efficacy to doxycycline and azithromycin, but it is more expensive to use and offers no advantage with regard to the dosage regimen. Levofloxacin has not been evaluated for treatment of C. trachomatis infection in clinical trials, but because its pharmacology and in vitro microbiologic activity are similar to that of ofloxacin, levofloxacin may be substituted in doses of 500 mg once a day for 7 days. Other quinolones either are not reliably effective against chlamydial infection or have not been adequately evaluated.

To maximize compliance with recommended therapies, medications for chlamydial infections should be dispensed on site, and the first dose should be directly observed. To minimize further transmission of infection, patients treated for chlamydia should be instructed to abstain from sexual intercourse for 7 days after single-dose therapy or until completion of a 7-day regimen. To minimize the risk for reinfection, patients also should be instructed to abstain from sexual intercourse until all of their sex partners are treated.

Follow-Up

Patients do not need to be retested for chlamydia after completing treatment with doxycycline or azithromycin unless symptoms persist or reinfection is suspected. A test of cure may be considered 3 weeks after completion of treatment with erythromycin. The validity of chlamydial culture testing at <3 weeks after completion of therapy to identify patients who did not respond to therapy has not been established. False-negative results can occur resulting from infections involving small numbers of chlamydial organisms. In addition, nonculture tests conducted at <3 weeks after completion of therapy for patients who were treated successfully could yield false-positive results because of continued excretion of dead organisms.

A high prevalence of C. trachomatis infection is found in women who have had chlamydial infection in the preceding several months. Most post-treatment infections result from reinfection, often occurring because patient's sex partners were not treated or because the patient resumed sex among a network of persons with a high prevalence of infection. Repeat infection confers an elevated risk of PID and other complications when compared with initial infection. Therefore, recently infected women are a high priority for repeat testing for C. trachomatis. For these reasons, clinicians and health-care agencies should consider advising all women with chlamydial infection to be rescreened 3--4 months after treatment. Some specialists believe rescreening is an especially high priority for adolescents.

Providers are also strongly encouraged to rescreen all women treated for chlamydial infection whenever they next present for care within the following 12 months, regardless of whether the patient believes that her sex partners were treated.

Rescreening is distinct from early retesting to detect therapeutic failure (test-of-cure). Except in pregnant women, test-of-cure is not recommended for persons treated with the recommended regimens, unless therapeutic compliance is in question.

Management of Sex Partners

Patients should be instructed to refer their sex partners for evaluation, testing, and treatment. The following recommendations on exposure intervals are based on limited evaluation. Sex partners should be evaluated, tested, and treated if they had sexual contact with the patient during the 60 days preceding onset of symptoms in the patient or diagnosis of chlamydia. The most recent sex partner should be evaluated and treated even if the time of the last sexual contact was >60 days before symptom onset or diagnosis.

Patients should be instructed to abstain from sexual intercourse until they and their sex partners have completed treatment. Abstinence should be continued until 7 days after a single-dose regimen or after completion of a 7-day regimen. Timely treatment of sex partners is essential for decreasing the risk for reinfecting the index patient.

Special Considerations

Pregnancy. Doxycycline and ofloxacin are contraindicated in pregnant women. However, clinical experience and preliminary data suggest that azithromycin is safe and effective. Repeat testing (preferably by culture) 3 weeks after completion of therapy with the following regimens is recommended for all pregnant women, because these regimens may not be highly efficacious and the frequent side effects of erythromycin might discourage patient compliance with this regimen.

Recommended Regimens

- Erythromycin base 500 mg orally four times a day for 7 days

  OR

- Amoxicillin 500 mg orally three times daily for 7 days

Alternative Regimens

- Erythromycin base 250 mg orally four times a day for 14 days

  OR

- Erythromycin ethylsuccinate 800 mg orally four times a day for 7 days

  OR

- Erythromycin ethylsuccinate 400 mg orally four times a day for 14 days

  OR

- Azithromycin 1 g orally, single dose

Note: Erythromycin estolate is contraindicated during pregnancy because of drug-related hepatotoxicity.

HIV Infection. Patients who have chlamydial infection and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative.

Chlamydial Infections Among Infants

Prenatal screening of pregnant women can prevent chlamydial infection among neonates. Pregnant women aged <25 years are at high risk for infection. Local or regional prevalence surveys of chlamydial infection can be conducted to confirm the validity of using these recommendations in particular settings.

C. trachomatis infection of neonates results from perinatal exposure to the mother's infected cervix. The prevalence of C. trachomatis infection among pregnant women does not vary by race/ethnicity or socioeconomic status. Neonatal ocular prophylaxis with silver nitrate solution or antibiotic ointments does not prevent perinatal transmission of C. trachomatis from mother to infant. However, ocular prophylaxis with those agents does prevent gonococcal ophthalmia and therefore should be continued (see Prevention of Ophthalmia Neonatorum).

Initial C. trachomatis perinatal infection involves mucous membranes of the eye, oropharynx, urogenital tract, and rectum. C. trachomatis infection in neonates is most often recognized by conjunctivitis that develops 5--12 days after birth. Chlamydia is the most frequent identifiable infectious cause of ophthalmia neonatorum. C. trachomatis also is a common cause of subacute, afebrile pneumonia with onset from 1--3 months of age. Asymptomatic infections also can occur in the oropharynx, genital tract, and rectum of neonates.

Ophthalmia Neonatorum Caused by C. trachomatis

A chlamydial etiology should be considered for all infants aged ≤30 days who have conjunctivitis.

Diagnostic Considerations

Sensitive and specific methods used to diagnose chlamydial ophthalmia in the neonate include both tissue culture and nonculture tests (e.g., direct fluorescent

antibody tests, enzyme immunoassays, and nucleic acid amplification tests). Specimens must contain conjunctival cells, not exudate alone. Specimens for culture isolation and nonculture tests should be obtained from the everted eyelid using a dacron-tipped swab or the swab specified by the manufacturer's test kit. A specific diagnosis of C. trachomatis infection confirms the need for treatment not only for the neonate, but also for the mother and her sex partner(s). Ocular exudate from infants being evaluated for chlamydial conjunctivitis should also be tested for N. gonorrhoeae.

Recommended Regimen

- Erythromycin base or ethylsuccinate 50 mg/kg/day orally divided into four doses daily for 14 days. (NOTE: An association between oral erythromycin and infantile hypertrophic pyloric stenosis (IHPS) has been reported in infants aged <6 weeks who were treated with this drug. Infants treated with erythromycin should be followed for signs and symptoms of infantile hypertrophic pyloric stenosis. Data on the use of macrolides (e.g., azithromycin and clarithromycin) for the treatment of neonatal chlamydia infection are limited. The results of one study involving a limited number of patients suggests that a short course of azithromycin, 20 mg/kg/day orally, one dose daily for 3 days, may be effective.)

Topical antibiotic therapy alone is inadequate for treatment of chlamydial infection and is unnecessary when systemic treatment is administered.

Follow-Up

The efficacy of erythromycin treatment is approximately 80%; a second course of therapy may be required, and follow-up of infants to determine whether treatment was effective is recommended. The possibility of concomitant chlamydial pneumonia should be considered.

Management of Mothers and Their Sex Partners

The mothers of infants who have chlamydial infection and the sex partners of these women should be evaluated and treated (see section on Chlamydial Infection in Adolescents and Adults, above).

Infant Pneumonia Caused by C. trachomatis

Characteristic signs of chlamydial pneumonia in infants include a) a repetitive staccato cough with tachypnea and b) hyperinflation and bilateral diffuse infiltrates on a chest radiograph. Wheezing is rare, and infants are typically afebrile. Peripheral eosinophilia sometimes occurs in infants who have chlamydial pneumonia. Because clinical presentations differ, initial treatment and diagnostic tests should encompass C. trachomatis for all infants aged 1--3 months who possibly have pneumonia.

Diagnostic Considerations

Specimens for chlamydial testing should be collected from the nasopharynx. Tissue culture is the definitive standard for chlamydial pneumonia. Nonculture tests (e.g., enzyme immunoassay [EIA], direct fluorescent antibody [DFA], and nucleic acid amplification [NAATs]) can be used, although nonculture tests of nasopharyngeal specimens produce lower sensitivity and specificity than nonculture tests of ocular specimens. Tracheal aspirates and lung biopsy specimens, if collected, should be tested for C. trachomatis.

Because of the delay in obtaining test results for chlamydia, the decision to include an agent in the antibiotic regimen that is active against C. trachomatis must frequently be based on clinical and radiologic findings. The results of tests for chlamydial infection assist in the management of an infant's illness and determine the need for treating the mother and her sex partner(s).

Recommended Regimen

- Erythromycin base or ethylsuccinate 50 mg/kg/day orally divided into four doses daily for 14 days

Follow-Up

The effectiveness of erythromycin in treating pneumonia caused by C. trachomatis is approximately 80%; a second course of therapy may be required. Follow-up of infants is recommended to determine whether the pneumonia has resolved. Some infants with chlamydial pneumonia have abnormal pulmonary function tests later in childhood.

Management of Mothers and Their Sex Partners

Mothers of infants who have chlamydial infection and the sex partners of these women should be evaluated and treated according to the recommended treatment of adults for chlamydial infections (see Chlamydial Infection in Adolescents and Adults).

Infants Born to Mothers Who Have Chlamydial Infection

Infants born to mothers who have untreated chlamydia are at high risk for infection; however, prophylactic antibiotic treatment is not indicated, and the efficacy of such treatment is unknown. Infants should be monitored to ensure appropriate treatment if infection develops.

Chlamydial Infections Among Children

Sexual abuse must be considered a cause of chlamydial infection in preadolescent children, although perinatally transmitted C. trachomatis infection of the nasopharynx, urogenital tract, and rectum may persist for >1 year (see Sexual Assault or Abuse of Children).

Diagnostic Considerations

Nonculture tests for chlamydia (e.g., non-amplified probes [enzyme immunoassay and direct fluorescent antibody]) should not be used because of the possibility of false-positive test results. With respiratory tract specimens, false-positive results can occur because of cross-reaction of test reagents with Chlamydia pneumoniae; with genital and anal specimens, false-positive results occur because of cross-reaction with fecal flora.

Recommended Regimens

Children who weigh <45 kg:

- Erythromycin base or ethylsuccinate 50 mg/kg/day orally divided into four doses daily for 14 days

Children who weigh >45 kg but who are aged <8 years:

- Azithromycin 1 g orally in a single dose

Children aged >8 years:

- Azithromycin 1 g orally in a single dose

  OR

- Doxycycline 100 mg orally twice a day for 7 days

Other Management Considerations

See the National Guideline Clearinghouse (NGC) summary of the Centers for Disease Control and Prevention (CDC) guideline Sexual Assault and STDs, section on Sexual Assault or Abuse of Children.

Follow-Up. Follow-up cultures are necessary to ensure that treatment has been effective.

Gonococcal Infections

Gonococcal Infections in Adolescents and Adults

In the United States, an estimated 600,000 new N. gonorrhoeae infections occur each year. Most infections among men produce symptoms that cause them to seek curative treatment soon enough to prevent serious sequelae, but this may not be soon enough to prevent transmission to others. Among women, many infections do not produce recognizable symptoms until complications (e.g., PID) have occurred. Both symptomatic and asymptomatic cases of PID can result in tubal scarring that can lead to infertility or ectopic pregnancy. Because gonococcal infections among women often are asymptomatic, an important component of gonorrhea control in the United States continues to be the screening of women at high risk for STDs.

Dual Therapy for Gonococcal and Chlamydial Infections

Patients infected with N. gonorrhoeae often are coinfected with C. trachomatis; this finding led to the recommendation that patients treated for gonococcal infection also be treated routinely with a regimen effective against uncomplicated genital C. trachomatis infection. Routine dual therapy without testing for chlamydia can be cost-effective for populations in which chlamydial infection accompanies 10%--30% of gonococcal infections, because the cost of therapy for chlamydia (e.g., $0.50-- $1.50 for doxycycline) is less than the cost of testing. Some specialists believe that the routine use of dual therapy has resulted in substantial decreases in the prevalence of chlamydial infection. Because most gonococci in the United States are susceptible to doxycycline and azithromycin, routine cotreatment may hinder the development of antimicrobial-resistant N. gonorrhoeae.

Since the introduction of dual therapy, the prevalence of chlamydial infection has decreased in some populations, and simultaneous testing for chlamydial infection has become quicker, more sensitive, and more widely available. In geographic areas in which the rates of coinfection are low, some clinicians might prefer a highly sensitive test for chlamydia rather than treating presumptively. However, presumptive treatment is indicated for patients who may not return for test results.

Quinolone-resistant N. gonorrhoeae (QRNG)

Quinolone-resistant N. gonorrhoeae continues to spread, making the treatment of gonorrhea with quinolones inadvisable in many areas. Quinolone-resistant N. gonorrhoeae is common in parts of Asia and the Pacific. In the United States, quinolone-resistant N. gonorrhoeae is becoming increasingly common in areas on the West Coast. Of 5,461 isolates collected by the Center for Disease Control and Prevention's (CDC's) Gonococcal Isolate Surveillance Project (GISP) during 2000, 19 (0.4%) had minimum inhibitory concentrations (MICs) $\geq$ 1.0 micrograms/mL to ciprofloxacin. The Gonococcal Isolate Surveillance Project indicated that the resistant isolates made up 0.2% of the samples collected from the 25 cities within the continental United States and Alaska; however, such isolates comprised 14.3% of the Honolulu Gonococcal Isolate Surveillance Project sample. Because of these and other data, quinolones are no longer recommended for the treatment of gonorrhea in the State of Hawaii and should not be used to treat infections that may have been acquired in Asia or the Pacific (including Hawaii). Recent data from several Gonococcal Isolate Surveillance Project sites in California demonstrate an increased prevalence of quinolone-resistant N. gonorrhoeae; therefore, the use of fluoroquinolones in California is probably inadvisable. Clinicians should obtain a recent travel history, including histories from sex partners, in those persons with gonorrhea to ensure appropriate antibiotic therapy.

Resistance of N. gonorrhoeae to fluoroquinolones and other antimicrobials is expected to continue to spread; therefore, surveillance for antimicrobial resistance is crucial for guiding therapy recommendations. The Gonococcal Isolate Surveillance Project, which samples approximately 3% of all U.S. men who have gonococcal infections, is a mainstay of surveillance. However, surveillance by clinicians is also important. Clinicians who diagnose N. gonorrhoeae infection in a

person who was treated with a recommended regimen and who likely has not been re-exposed should perform culture and susceptibility testing of relevant clinical specimens and report the case to the local health department.

Uncomplicated Gonococcal Infections of the Cervix, Urethra, and Rectum

Recommended Regimens

- Cefixime 400 mg orally in a single dose

  OR

- Ceftriaxone 125 mg intramuscularly in a single dose

  OR

- Ciprofloxacin 500 mg orally in a single dose*

  OR

- Ofloxacin 400 mg orally in a single dose*

  OR

- Levofloxacin 250 mg orally in a single dose*

PLUS, IF CHLAMYDIAL INFECTION IS NOT RULED OUT

- Azithromycin 1 g orally in a single dose

  OR

- Doxycycline 100 mg orally twice a day for 7 days

*Note: Quinolones should not be used for infections acquired in Asia or the Pacific, including Hawaii. In addition, use of quinolones is probably inadvisable for treating infections acquired in California and in other areas with increased prevalence of quinolone resistance.

Cefixime has an antimicrobial spectrum similar to that of ceftriaxone, but the 400-mg oral dose does not provide as high nor as sustained a bactericidal level as that provided by the 125-mg dose of ceftriaxone. In published clinical trials, the 400-mg cured 97.4% of uncomplicated urogenital and anorectal gonococcal infections. The advantage of cefixime is that it can be administered orally.

Ceftriaxone in a single injection of 125 mg provides sustained, high bactericidal levels in the blood. Extensive clinical experience indicates that ceftriaxone is safe and effective for the treatment of uncomplicated gonorrhea at all anatomic sites, curing 99.1% of uncomplicated urogenital and anorectal infections in published clinical trials.

Ciprofloxacin is effective against most strains of N. gonorrhoeae in the United States (excluding Hawaii). At a dose of 500 mg, ciprofloxacin provides sustained bactericidal levels in the blood; in published clinical trials, it has cured 99.8% of uncomplicated urogenital and anorectal infections. Ciprofloxacin is safe, inexpensive, and can be administered orally.

Ofloxacin also is effective against most strains of N. gonorrhoeae in the United States (excluding Hawaii), and it has favorable pharmacokinetics. The 400-mg oral dose has been effective for treatment of uncomplicated urogenital and anorectal infections, curing 98.6% of infections in published clinical trials. Levofloxacin, the active l-isomer of ofloxacin, can be used in place of ofloxacin as a single dose of 250 mg.

Alternative Regimens

- Spectinomycin 2 g in a single, intramuscular dose. Spectinomycin is expensive and must be injected; however, it has been effective in published clinical trials, curing 98.2% of uncomplicated urogenital and anorectal gonococcal infections. Spectinomycin is useful for treatment of patients who cannot tolerate cephalosporins and quinolones.
- Single-dose cephalosporin regimens (other than ceftriaxone 125 mg intramuscularly and cefixime 400 mg orally) that are safe and highly effective against uncomplicated urogenital and anorectal gonococcal infections include ceftizoxime (500 mg, administered intramuscularly), cefoxitin (2 g, administered intramuscularly with probenecid 1 g orally), and cefotaxime (500 mg, administered intramuscularly). None of the injectable cephalosporins offer any advantage over ceftriaxone.
- Single-dose quinolone regimens include gatifloxacin 400 mg orally, norfloxacin 800 mg orally, and lomefloxacin 400 mg orally. These regimens appear to be safe and effective for the treatment of uncomplicated gonorrhea, but data regarding their use are limited. None of the regimens appear to offer any advantage over ciprofloxacin at a dose of 500 mg, ofloxacin at 400 mg, or levofloxacin at 250 mg.

Many other antimicrobials are active against N. gonorrhoeae, but none have substantial advantages over the recommended regimens. Azithromycin 2 g orally is effective against uncomplicated gonococcal infection, but it is expensive and causes gastrointestinal distress, so it is not recommended for treatment of gonorrhea. At an oral dose of 1 g, azithromycin is insufficiently effective and is not recommended.

Uncomplicated Gonococcal Infections of the Pharynx

Gonococcal infections of the pharynx are more difficult to eradicate than infections at urogenital and anorectal sites. Few antimicrobial regimens can reliably cure >90% of infections.

Although chlamydial coinfection of the pharynx is unusual, coinfection at genital sites sometimes occurs. Therefore, treatment for both gonorrhea and chlamydia is recommended.

Recommended Regimens

- Ceftriaxone 125 mg intramuscularly in a single dose

  OR

- Ciprofloxacin 500 mg orally in a single dose (NOTE: Quinolones should not be used for infections acquired in Asia or the Pacific, including Hawaii. In addition, use of quinolones is probably inadvisable for treating infections acquired in California and in other areas with increased prevalence of quinolone resistance.)

  PLUS, IF CHLAMYDIAL INFECTION IS NOT RULED OUT

- Azithromycin 1 g orally in a single dose

  OR

- Doxycycline 100 mg orally twice daily for 7 days

Follow-Up

Patients who have uncomplicated gonorrhea and who are treated with any of the recommended regimens need not return for a test to confirm that they are cured. Patients who have symptoms that persist after treatment should be evaluated by culture for N. gonorrhoeae, and any gonococci isolated should be tested for antimicrobial susceptibility. Infections identified after treatment with one of the recommended regimens usually result from reinfection rather than treatment failure, indicating a need for improved patient education and referral of sex partners. Persistent urethritis, cervicitis, or proctitis also may be caused by C. trachomatis and other organisms.

Management of Sex Partners

Patients should be instructed to refer their sex partners for evaluation and treatment. All sex partners of patients who have N. gonorrhoeae infection should be evaluated and treated for N. gonorrhoeae and C. trachomatis infections if their last sexual contact with the patient was within 60 days before onset of symptoms or diagnosis of infection in the patient. If a patient's last sexual intercourse was >60 days before onset of symptoms or diagnosis, the patient's most recent sex partner should be treated. Patients should be instructed to avoid sexual intercourse until therapy is completed and until they and their sex partners no longer have symptoms.

Special Considerations

Allergy, Intolerance, and Adverse Reactions

Persons who cannot tolerate cephalosporins or quinolones should be treated with spectinomycin. Because spectinomycin is unreliable (i.e., only 52% effective) against pharyngeal infections, patients who have suspected or known pharyngeal infection should have a pharyngeal culture evaluated 3--5 days after treatment to verify eradication of infection.

Pregnancy

Pregnant women should not be treated with quinolones or tetracyclines. Those infected with N. gonorrhoeae should be treated with a recommended or alternate cephalosporin. Women who cannot tolerate a cephalosporin should be administered a single, 2-g dose of spectinomycin intramuscularly. Either erythromycin or amoxicillin is recommended for treatment of presumptive or diagnosed C. trachomatis infection during pregnancy.

Administration of Quinolones to Adolescents

Fluoroquinolones have not been recommended for persons aged <18 years because studies have indicated that they can damage articular cartilage in some young animals. However, no joint damage attributable to quinolone therapy has been observed in children treated with prolonged ciprofloxacin regimens. Thus, children who weigh >45 kg can be treated with any regimen recommended for adults.

HIV Infection

Patients who have gonococcal infection and also are infected with HIV should receive the same treatment regimen as those who are HIV-negative.

Gonococcal Conjunctivitis

In the only published study of the treatment of gonococcal conjunctivitis among United States adults, all 12 study participants responded to a single 1-g intramuscular injection of ceftriaxone. The following recommendations reflect the opinions of consultants knowledgeable in the field of STDs.

Recommended Regimen

- Ceftriaxone 1 g intramuscularly in a single dose.

Note: Consider lavage of the infected eye with saline solution once.

Management of Sex Partners

Patients should be instructed to refer their sex partners for evaluation and treatment (see Gonococcal Infection, Management of Sex Partners).

Disseminated Gonococcal Infection (DGI)

DGI results from gonococcal bacteremia. DGI often results in petechial or pustular acral skin lesions, asymmetrical arthralgia, tenosynovitis, or septic arthritis. The infection is complicated occasionally by perihepatitis and rarely by endocarditis or meningitis. Some strains of N. gonorrhoeae that cause DGI may cause minimal genital inflammation.

No recent studies of the treatment of DGI among United States adults have been published. The following recommendations reflect the opinions of consultants knowledgeable in the STD field. No treatment failures have been reported using the following recommended regimen.

Treatment

Hospitalization is recommended for initial therapy, especially for patients who may not comply with treatment, for those in whom diagnosis is uncertain, and for those who have purulent synovial effusions or other complications. Patients should be examined for clinical evidence of endocarditis and meningitis. Patients treated for DGI should be treated presumptively for concurrent C. trachomatis infection, unless appropriate testing excludes this infection.

Recommended Regimen

- Ceftriaxone 1 g intramuscularly or intravenously every 24 hours

Alternative Regimens

- Cefotaxime 1 g intravenously every 8 hours

  OR

- Ceftizoxime 1 g intravenously every 8 hours

  OR

- Ciprofloxacin 400 mg intravenously every 12 hours*

  OR

- Ofloxacin 400 mg intravenously every 12 hours*

  OR

- Levofloxacin 250 mg intravenously daily*

  OR

- Spectinomycin 2 g intramuscularly every 12 hours

All of the preceding regimens should be continued for 24--48 hours after improvement begins, at which time therapy may be switched to one of the following regimens to complete at least 1 week of antimicrobial therapy.

- Cefixime 400 mg orally twice daily

  OR

- Ciprofloxacin 500 mg orally twice daily*

  OR

- Ofloxacin 400 mg orally twice daily*

  OR

- Levofloxacin 500 mg orally once daily*

*Note: Quinolones should not be used for infections acquired in Asia or the Pacific, including Hawaii. In addition, use of quinolones is probably inadvisable for treating infections acquired in California and in other areas with increased prevalence of quinolone resistance.

Management of Sex Partners

Gonococcal infection often is asymptomatic in sex partners of patients who have DGI. As with uncomplicated gonococcal infections, patients should be instructed to refer their sex partners for evaluation and treatment (see Gonococcal Infection, Management of Sex Partners).

Gonococcal Meningitis and Endocarditis

Recommended Regimen

- Ceftriaxone 1--2 g intravenously every 12 hours.

Therapy for meningitis should be continued for 10--14 days; therapy for endocarditis should be continued for at least 4 weeks. Treatment of complicated DGI should be undertaken in consultation with a specialist.

Management of Sex Partners

Patients should be instructed to refer their sex partners for evaluation and treatment (see Gonococcal Infection, Management of Sex Partners).

Gonococcal Infections Among Infants

Gonococcal infection among infants usually results from exposure to infected cervical exudate at birth. It is usually an acute illness that becomes manifest 2--5

days after birth. The prevalence of infection among infants depends on the prevalence of infection among pregnant women, on whether pregnant women are screened for gonorrhea, and on whether newborns receive ophthalmia prophylaxis.

The most severe manifestations of N. gonorrhoeae infection in newborns are ophthalmia neonatorum and sepsis, including arthritis and meningitis. Less severe manifestations include rhinitis, vaginitis, urethritis, and inflammation at sites of fetal monitoring.

Ophthalmia Neonatorum Caused by N. gonorrhoeae

In the United States, although N. gonorrhoeae causes ophthalmia neonatorum less often than C. trachomatis and nonsexually transmitted agents, identifying and treating this infection is especially important because ophthalmia neonatorum can result in perforation of the globe of the eye and blindness.

Diagnostic Considerations

Infants at increased risk for gonococcal ophthalmia are those who do not receive ophthalmia prophylaxis and those whose mothers have had no prenatal care or whose mothers have a history of sexually transmitted diseases or substance abuse. Gonococcal ophthalmia is strongly suspected when intracellular Gram-negative diplococci are identified in conjunctival exudate, justifying presumptive treatment for gonorrhea after appropriate cultures for N. gonorrhoeae are obtained. Appropriate chlamydial testing should be done simultaneously. Presumptive treatment for N. gonorrhoeae may be indicated for newborns who are at increased risk for gonococcal ophthalmia and who have conjunctivitis but do not have gonococci in a Gram-stained smear of conjunctival exudate.

In all cases of neonatal conjunctivitis, conjunctival exudate should be cultured for N. gonorrhoeae and tested for antibiotic susceptibility before a definitive diagnosis is made. A definitive diagnosis is important because of the public health and social consequences of a diagnosis of gonorrhea. Nongonococcal causes of neonatal ophthalmia include Moraxella catarrhalis and other Neisseria species that are indistinguishable from N. gonorrhoeae on Gram-stained smear but can be differentiated in the microbiology laboratory.

Recommended Regimen

- Ceftriaxone 25--50 mg/kg intravenously or intramuscularly in a single dose, not to exceed 125 mg.

Note: Topical antibiotic therapy alone is inadequate and is unnecessary if systemic treatment is administered.

Other Management Considerations

Simultaneous infection with C. trachomatis should be considered when a patient does not improve after treatment. Both mother and infant should be tested for chlamydial infection at the same time that gonorrhea testing is conducted (see

Ophthalmia Neonatorum Caused by C. Trachomatis). Ceftriaxone should be administered cautiously to hyperbilirubinemic infants, especially those born prematurely.

Follow-Up

Infants who have gonococcal ophthalmia should be hospitalized and evaluated for signs of disseminated infection (e.g., sepsis, arthritis, and meningitis). One dose of ceftriaxone is adequate therapy for gonococcal conjunctivitis.

Management of Mothers and Their Sex Partners

The mothers of infants who have gonococcal infection and the mothers' sex partners should be evaluated and treated according to the recommendations for treating gonococcal infections in adults (see Gonococcal Infection in Adolescents and Adults).

Disseminated Gonococcal Infection and Gonococcal Scalp Abscesses in Newborns

Sepsis, arthritis, and meningitis (or any combination of these conditions) are rare complications of neonatal gonococcal infection. Localized gonococcal infection of the scalp can result from fetal monitoring through scalp electrodes. Detection of gonococcal infection in neonates who have sepsis, arthritis, meningitis, or scalp abscesses requires cultures of blood, cerebrospinal fluid (CSF), and joint aspirate on chocolate agar. Specimens obtained from the conjunctiva, vagina, oropharynx, and rectum that are cultured on gonococcal selective medium are useful for identifying the primary site(s) of infection, especially if inflammation is present. Positive Gram-stained smears of exudate, cerebrospinal fluid, or joint aspirate provide a presumptive basis for initiating treatment for N. gonorrhoeae. Diagnoses based on Gram-stained smears or presumptive identification of cultures should be confirmed with definitive tests on culture isolates.

Recommended Regimen

- Ceftriaxone 25--50 mg/kg/day intramuscularly or intravenously in a single daily dose for 7 days, with a duration of 10--14 days, if meningitis is documented

  OR

- Cefotaxime 25 mg/kg intravenously or intramuscularly every 12 hours for 7 days, with a duration of 10--14 days, if meningitis is documented

Prophylactic Treatment for Infants Whose Mothers Have Gonococcal Infection

Infants born to mothers who have untreated gonorrhea are at high risk for infection.

Recommended Regimen in the Absence of Signs of Gonococcal Infection

- Ceftriaxone 25--50 mg/kg intravenously or intramuscularly, not to exceed 125 mg, in a single dose.

Other Management Considerations

Both mother and infant should be tested for chlamydial infection.

Follow-Up

Follow-up examination is not required.

Management of Mothers and Their Sex Partners

The mothers of infants who have gonococcal infection and the mothers' sex partners should be evaluated and treated according to the recommendations for treatment of gonococcal infections in adults (see Gonococcal Infections).

Gonococcal Infections Among Children

Sexual abuse is the most frequent cause of gonococcal infection in pre-adolescent children (see the NGC summary of the CDC guideline Sexual Assault and STDs, section on Sexual Assault or Abuse of Children. Vaginitis is the most common manifestation of gonococcal infection in preadolescent girls. PID disease following vaginal infection is probably less common in children than among adults. Among sexually abused children, anorectal and pharyngeal infections with N. gonorrhoeae are common and frequently asymptomatic.

Diagnostic Considerations

Because of the legal implications of a diagnosis of N. gonorrhoeae infection in a child, only standard culture procedures for the isolation of N. gonorrhoeae should be used for children. Nonculture gonococcal tests for gonococci (e.g., Gram-stained smear, deoxyribonucleic acid (DNA) probes, enzyme immunoassay, and nucleic acid amplification tests) should not be used alone; none of these tests have been approved by Food and Drug Administration (FDA) for use with specimens obtained from the oropharynx, rectum, or genital tract of children. Specimens from the vagina, urethra, pharynx, or rectum should be streaked onto selective media for isolation of N. gonorrhoeae, and all presumptive isolates of N. gonorrhoeae should be identified definitively by at least two tests that involve different principles (e.g., biochemical, enzyme substrate, or serologic). Isolates should be preserved to enable additional or repeated testing.

Recommended Regimens for Children Who Weigh ≥45 kilogram

Treat with one of the regimens recommended for adults (see Gonococcal Infections).

Note: Fluoroquinolones have not been recommended for persons aged <18 years because they have damaged articular cartilage in young animals. However, no such joint damage clearly attributable to quinolone therapy has been observed in children, even in those receiving multiple-dose regimens.

Recommended Regimens for Children Who Weigh <45 kilograms and Who Have Uncomplicated Gonococcal Vulvovaginitis, Cervicitis, Urethritis, Pharyngitis, or Proctitis

- Ceftriaxone 125 mg intramuscularly in a single dose.

Alternative Regimen

- Spectinomycin 40 mg/kg (maximum dose: 2 g) intramuscularly in a single dose may be used, but this therapy is unreliable for treatment of pharyngeal infections. Some specialists use cefixime to treat gonococcal infections in children because it can be administered orally; however, no reports have been published concerning the safety or effectiveness of cefixime used for this purpose.

Recommended Regimen for Children Who Weigh <45 kilogram and Who Have Bacteremia or Arthritis

- Ceftriaxone 50 mg/kg (maximum dose: 1 g) intramuscularly or intravenously in a single dose daily for 7 days.

Recommended Regimen for Children Who Weigh ≥45 kilogram and Who Have Bacteremia or Arthritis

- Ceftriaxone 50 mg/kg intramuscularly or intravenously in a single dose daily for 7 days.

Follow-Up

Follow-up cultures are unnecessary if ceftriaxone is used. If spectinomycin is used to treat pharyngitis, a follow-up culture is necessary to ensure that treatment was effective.

Other Management Considerations

Only parenteral cephalosporins are recommended for use in children. Ceftriaxone is approved for all gonococcal infections in children; cefotaxime is approved for gonococcal ophthalmia only. Oral cephalosporins used for treatment of gonococcal infections in children have not been adequately evaluated.

All children who have gonococcal infections should be evaluated for coinfection with syphilis and C. trachomatis. (For a discussion of concerns regarding sexual assault, refer to the NGC summary of the CDC guideline Sexual Assault and STDs, section on Sexual Assault or Abuse of Children.

Ophthalmia Neonatorum Prophylaxis

To prevent gonococcal ophthalmia neonatorum, a prophylactic agent should be instilled into the eyes of all newborn infants; this procedure is required by law in most states. All of the recommended prophylactic regimens in this section prevent gonococcal ophthalmia. However, the efficacy of these preparations in preventing chlamydial ophthalmia is less clear, and they do not eliminate nasopharyngeal colonization by C. trachomatis. The diagnosis and treatment of gonococcal and chlamydial infections in pregnant women is the best method for preventing neonatal gonococcal and chlamydial disease. Not all women, however, receive prenatal care. Ocular prophylaxis is warranted because it can prevent sight-threatening gonococcal ophthalmia and because it is safe, easy to administer, and inexpensive.

Prophylaxis

Recommended Regimens

- Silver nitrate (1%) aqueous solution in a single application

  OR

- Erythromycin (0.5%) ophthalmic ointment in a single application

  OR

- Tetracycline ophthalmic ointment (1%) in a single application

One of these recommended preparations should be instilled into both eyes of every neonate as soon as possible after delivery. If prophylaxis is delayed (i.e., not administered in the delivery room), a monitoring system should be established to ensure that all infants receive prophylaxis. All infants should be administered ocular prophylaxis, regardless of whether they are delivered vaginally or by cesarean section. Single-use tubes or ampules are preferable to multiple-use tubes. Bacitracin is not effective. Use of povidone iodine has not been studied adequately.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

Throughout the 2002 guideline document, the evidence used as the basis for specific recommendations is discussed briefly. More comprehensive, annotated discussions of such evidence will appear in background papers that will be published in a supplement issue of the journal Clinical Infectious Diseases.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Appropriate screening and management of urethritis, nongonococcal urethritis, mucopurulent cervicitis, chlamydial infection, and gonococcal infection
- Prevention of transmission of urethritis, nongonococcal urethritis, chlamydial infection, and gonococcal infection to sex partners and infants of infected mothers

Specifically:

- In published clinical trials, a 400-mg dose of cefixime cured 97.4% of uncomplicated urogenital and anorectal gonococcal infections.
- Ceftriaxone has been reported to cure 99.1% of uncomplicated urogenital and anorectal gonococcal infections.
- Ciprofloxacin has been reported to cure 99.8% of uncomplicated urogenital and anorectal gonococcal infections. In addition, it is safe, relatively inexpensive and can be administered orally.
- Ofloxacin at 400-mg oral dose has been reported to cure 99.4% of uncomplicated urogenital and anorectal gonococcal infections.
- Spectinomycin (2 g intramuscularly in a single dose) has been reported to cure 98.2% of uncomplicated urogenital and anorectal gonococcal infections.

Subgroups Most Likely to Benefit:

- Sexually active adolescents and young adults
- Infants of mothers with chlamydial or gonococcal infection
- Spectinomycin is useful for treatment of patients who cannot tolerate cephalosporins and quinolones

POTENTIAL HARMS

- The frequent side effects of erythromycin might discourage patient compliance with this regimen.
- An association between oral erythromycin and infantile hypertrophic pyloric stenosis (IHPS) has been reported in infants aged <6 weeks who were treated with this drug.

Subgroups Most Likely to be Harmed:

- The safety and efficacy of azithromycin use in pregnant and lactating women have not been established.
- Infants treated with erythromycin should be followed for signs and symptoms of infantile hypertrophic pyloric stenosis.

- Pregnant women should not be treated with quinolones or tetracyclines.
- Ceftriaxone should be administered cautiously to hyperbilirubinemic infants, especially those born prematurely.

CONTRAINDICATIONS

CONTRAINDICATIONS

- Doxycycline and ofloxacin are contraindicated for pregnant women.
- Erythromycin estolate is contraindicated during pregnancy because of drug-related hepatotoxicity.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

These recommendations were developed in consultation with public- and private-sector professionals knowledgeable in the treatment of patients with sexually transmitted diseases (STDs). They are applicable to various patient-care settings, including family planning clinics, private physicians' offices, managed care organizations, and other primary-care facilities. When using these guidelines, the disease prevalence and other characteristics of the medical practice setting should be considered. These recommendations should be regarded as a source of clinical guidance and not as standards or inflexible rules. These guidelines focus on the treatment and counseling of individual patients and do not address other community services and interventions that are important in sexually transmitted disease/human immunodeficiency virus (STD/HIV) prevention.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Centers for Disease Control and Prevention. Diseases characterized by urethritis and cervicitis. Sexually transmitted diseases treatment guidelines. MMWR Recomm Rep 2002 May 10;51(RR-6):30-42.

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1993 (revised 2002 May 10)

GUIDELINE DEVELOPER(S)

Centers for Disease Control and Prevention - Federal Government Agency [U.S.]

GUIDELINE DEVELOPER COMMENT

These guidelines for the treatment of patients who have sexually transmitted diseases (STDs) were developed by the Centers for Disease Control and Prevention (CDC) after consultation with a group of professionals knowledgeable in the field of STDs who met in Atlanta on September 26--28, 2000.

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United States Government

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Not stated

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

The information in this report updates the "1998 Sexually Transmitted Diseases Treatment Guidelines" (MMWR 1998;47[No. RR-1]).

GUIDELINE AVAILABILITY

Electronic copies: Available from the Centers for Disease Control and Prevention (CDC) Web site:

- HTML version
- Portable Document Format (PDF)

Print copies: Available from the Centers for Disease Control and Prevention, MMWR, Atlanta, GA 30333. Additional copies can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325; (202) 783-3238.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Workowski KA, Levine WC, Wasserheit JN. U.S. Centers for Disease Control and Prevention guidelines for the treatment of sexually transmitted diseases: an opportunity to unify clinical and public health practice. Ann Intern Med. 2002 Aug 20;137(4):255-62. Electronic copies: Available through Annals of Internal Medicine Online.
- Sexually Transmitted Diseases Treatment Guidelines 2002 for PDA or Palm OS. Available from the CDC National Prevention Information Network (NPIN) Web site.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on August 19, 2002.

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